

## CLAIMS

### What is Claimed is:

1. A sensing device comprising:  
a substrate;  
5 at least one nanotube disposed on the substrate;  
at least one electrical contact, the contact being in electrical  
communication with the at least one nanotube; and  
a liquid in contact with the at least one nanotube, wherein the liquid has an  
electrical conductivity not substantially greater than the electrical conductivity of  
10 cyclohexane.
2. The sensing device of Claim 1, wherein the liquid comprises cyclohexane.
3. The sensing device of Claim 1, wherein the at least one nanotube spans  
between two electrical contacts.
4. The sensing device of Claim 1, wherein the at least one electrical contact  
15 comprises a titanium material.
5. The sensing device of Claim 2, wherein the substrate comprises a silicon  
material configured to provide an electrical gate.
6. A method for sensing an analyte dissolved in a liquid, the method  
comprising:  
20 wetting a NTFE device with a liquid, the device comprising at least one  
nanotube in electrical contact with a source electrode and a drain electrode and  
disposed over an electrical gate; and  
measuring an electrical property of the NTFE device while wetted with the  
liquid.

7. The method of Claim 6, wherein the wetting step further comprises wetting the NTFE device with a solvent having a conductivity similar to cyclohexane.

8. The method of Claim 6, wherein the wetting step further comprises wetting the NTFE device with cyclohexane.

5 9. The method of Claim 6, wherein the wetting step further comprises wetting the NTFE device with cyclohexane in which an analyte is dissolved.

10. The method of Claim 6, wherein the wetting step further comprises streaming the liquid over the NTFE device.

10 11. The method of Claim 6, further comprising determining information relating to an analyte in the liquid using information from the measuring step.

12. The method of Claim 6, further comprising determining a species of analyte in the liquid using information from the measuring step.

13. The method of Claim 6, further comprising determining a concentration of analyte in the liquid using information from the measuring step.

15 14. The method of Claim 6, wherein the measuring step further comprises determining a relationship between a gate voltage and a conductance of the NTFE device.

15. The method of Claim 6, further comprising determining a gate voltage shift.

20 16. The method of Claim 6, further comprising determining a hysteresis.

17. The method of Claim 6, further comprising processing a measured shift in a threshold gate voltage/conductivity values and a Hammett sigma value to identify an analyte species.

18. The method of Claim 6, further comprising processing a measured shift in a threshold gate voltage/conductivity values to determine an analyte concentration in the liquid.

19. The method of Claim 6, further comprising processing a gate voltage shift  
5 and a hysteresis to determine information relating to an analyte in the liquid.